Research Article

Growth and economic performance of diploid and triploid Pacific oysters Crassostrea gigas cultivated in three lagoons of the Gulf of California

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ABSTRACT. Diploid and triploid Crassostrea gigas oysters were cultivated at three farms (Guasave, Navolato and Ahone) in Sinaloa, Mexico, to evaluate their growth and economic performances. Growth rate and survival of oysters were compared in long-line cultivation and were mostly affected by water parameters rather than ploidy or their interaction. The highest growth rates for shell length (8.01 mm month-1) and body weight (9.08 g month-1) were obtained for the Ahone/triploid group. Survival differed significantly from 98.6% for the Guasave/triploids to 76.7% for the Ahone/diploids. After the first production cycle, more than 80% of production costs represent the purchase of cultivation equipment and salaries contributed with around 9%. The Guasave farm produced the highest profits (US$8,053.71 diploids, US$8,182.19 triploid). Use of triploids starting the production cycle on October-November to avoid mortality and improve final profit is recommended.

Keywords: oysters, suspended cultivation, growth rate, environmental conditions, profit.

INTRODUCTION

From all the cultivated bivalves, the Pacific oyster Crassostrea gigas (Thunberg, 1795) contributed with around 10% of the mollusks worldwide production in 2013 (FAO, 2015). Due to its fast growth (Taras et al., 2007), resistance to variations of temperature and salinity (Flores-Vergara et al., 2004), meat quality (Langdon et al., 2003), shell shape (Ward et al., 2000), and disease resistance (Villanueva-Fonseca & Escobedo-Bonilla, 2013), this species has been introduced in many countries of the world (Soletchik et al., 2002), including Mexico. Despite of the growing interest for its cultivation, there are still some factors that need to be studied to support the economy of this industry, such as genetics and specific strains adapted to local conditions of new cultivation sites.

Noriega-Curtis (2012) stated that research on the systematic use of triploids represents one of the most important requirements for oyster farming in Mexico. Triploidy is widely used to obtain faster growth in different oyster species (Nell, 2002) since produces sterility (Garnier-Géré et al., 2002), which would divert more metabolic flux to growth reducing their energy needs for reproduction, and an increased volume of polyploid cells (Guo & Allen, 1994). An additional benefit trait of all-triploid C. gigas would be the reduction of genetic pollution from the escape of cultivated stock (Guo et al., 1996) because triploids are incapable of colonization. However, growth responses of both diploid and triploid organisms partially depend on the environmental conditions. For instance, Maguire et al. (1994) reported relatively small increases in growth rates of triploid Pacific oysters in Tasmania, Australia, meanwhile, Akashiige & Fushimi (1992) and Chao et al. (1999), obtained faster growth rates of triploids in Japan and Taiwan, respectively, compared with that of diploids. It is accepted that environmental